

ACCIDENT INVESTIGATION REPORT # 91NMGDescription of Accident

On August 16, 1991, an Ergon Trucking Company bulk product trailer ruptured while being unloaded by Vista Chemical Company personnel in the Aberdeen Chemical Plant. The trailer hopper was destroyed. The Vista Chemical truck to which the trailer was connected suffered moderate damage.

Prior to the accident, at about 11:15 a.m., Yard Operators Horace Lindsey and Douglas Spann and Compound Shift Supervisor James Howell began preparations for air-conveying the trailer contents of approximately 15,000 pounds of off-grade RP 461 WT 110 dry blend to the Dry Blend Boxing Hopper. The trailer had been brought into the plant to be loaded for shipment to a customer. In the process, the product was found to be out of specification, requiring the trailer to be unloaded and the product boxed out.

After positioning the truck and trailer (see Attachment 1 - "MISCELLANEOUS TRUCK, TRAILER, BLOWER, AND RELIEF VALVE DETAILS"), just east of the Compound Silos, Lindsey, Spann, and Howell connected the trailer unloading flex line to a metal transfer line leading to the boxing hopper located some 275 feet away. After ensuring that the valves below the trailer hopper cones were closed and that the main line between the truck's positive displacement air pump and the unloading flex line was completely open, they adjusted the truck speed to 1,600-1,800 RPM and started the blower at a setting of 10 psig.

Having confirmed that air was moving through the lines and that everything appeared in order, they began transferring product by slightly opening all four of the valves below the trailer hopper cones. They checked the pressure and listened to confirm that the product was moving through the lines. It was noted that the trailer dome lids did not have to be tightened, as is sometimes the case.

After agreeing that everything was operating normally, and that the set-up was correct, all three men left the scene at approximately 11:40 a.m., Lindsey and Spann going to the Truck Scale House, Howell to the Compound Offices.

At 11:45 a.m., a loud, low-pitched, jarring explosion was heard in the unloading area. An eye witness, Engineer Dan Johnson, watched from his location on a hill near the Boiler House, as the truck and trailer were blown onto their left sides, enveloped in a large, white cloud of product.

Immediately after the explosion, people arriving on the scene found the truck and trailer laying on their left sides. The truck was still running and diesel fuel was leaking onto the muffler. The trailer unloading flex hose was still connected to both the trailer and the boxing hopper transfer line. The trailer hopper was split open on the

right side just above the hopper cones for almost the entire length of the trailer. The trailer dome lids were still closed, although deformed outward. The valve between the blower and the trailer unloading line was completely open. The valve between the blower and the top of the trailer was about half-open. All four valves below the hopper cones were slightly open.

Dan Johnson, one the first people to get to the scene, climbed inside the truck cab, turned off the ignition, and hit the "power take off button," unaware this would not stop the engine. Doug Spann, who arrived during this time, climbed into the cab and hit the kill switch, stopping the engine.

Other employees arriving on the scene became concerned with the fire hazard presented by diesel fuel leaking onto the hot muffler and sprayed the hot metal with water from a fire hose. Others began containment operations to prevent fuel, oil, and product from getting into a nearby sewer. Both efforts were successful.

After Conditions had been stabilized and the area secured, an investigation team was quickly formed and began work immediately.

Investigation showed that, although 3,130 pounds of product had been transferred to the boxing hopper and boxed out, the hopper transfer line had plugged ( between 11:40 and 11:45 ). Sixty pounds of product were later removed from the line. The trailer unloading flex line was not plugged.

A closer examination of the hopper rupture was begun. Based on the rupture pattern, including the folding of the aluminum-magnesium alloy, the failure appeared to have begun at or near the vicinity of a patch found on the right front side of the hopper. Further examination revealed that the patch seams had been covered on the inside of the hopper with an elastomeric coating, thought to be "RTV" silicone rubber.

Since it was not immediately apparent whether or not either of the two relief valves (one on the trailer, one on the truck) had opened, both were removed and tested. The tests were performed by Tri-State Valve & Instrument Co., of Memphis, Tennessee. The test results are shown in their report (attached). During testing, the truck relief valve leaked at 13 psig and lifted at 15.5 psig. The trailer relief valve was pressured up to 25 psig and never lifted, disassembly showing the internal parts to be badly corroded, with the valve guide frozen in place.

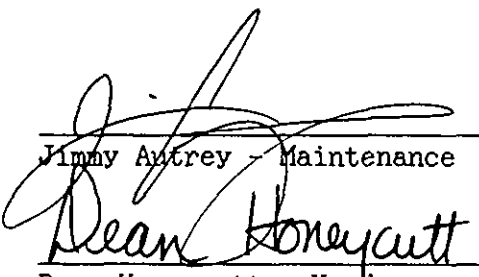
Three samples of the trailer hopper metal were taken in the vicinity of the welded patch under the direction of Kenneth Shelton, of the Vista Chemical Co. Central Engineering Department. A metallurgical analysis of the samples was subsequently conducted by Corrmec Engineering Services, of Houston, Texas. Their test results are shown in their report (attached). The results showed that the repair weld contributed to the hopper rupture, being of poor quality in workmanship, including the use of an electrode/ filler metal which was incompatible with the base metal alloy.

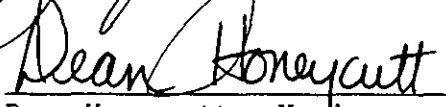
Cause

The primary cause of the bulk trailer rupture was a defective repair weld on the trailer hopper shell. During normal operation, the weld failed below the rated pressures of the trailer and the blower relief valve.

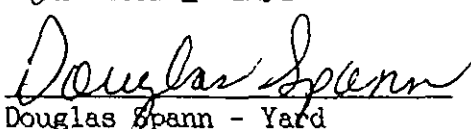
Recommendations

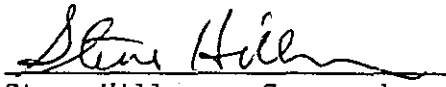
| <u>Item</u>                                                                                                                       | <u>Responsibility</u> | <u>Target Completion</u> |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|
| 1. Require operators of bulk trailers to perform regular, documented pressure testing of trailer relief valves and hopper shells. | B. Seymour            | COMPLETE                 |
| 2. Prohibit the use of plant-owned trucks for unloading bulk trailers.                                                            | B. Seymour            | COMPLETE                 |
| 3. Devise and implement a program for restricting access to bulk trailer unloading areas to operators during unloading.           | J. Olson              | 6/1/92                   |

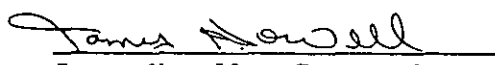
  
Jimmy Autrey - Maintenance

  
Dean Honeycutt - Yard

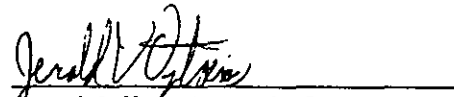
  
John Olson - Vinyl

  
Douglas Spann - Yard

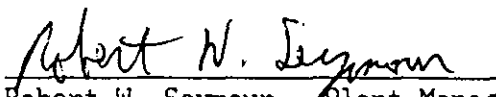
  
Steve Hillman - Compound

  
James Howell - Compound

  
Horace Lindsey - Yard

  
Gerald Uptain - Safety

APPROVED BY:

  
Robert W. Seymour - Plant Manager

Date: 4/27/92